



FERMILAB

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**From:** J. Anderson Jr.  
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The project has made significant progress identifying the radiological hazards and their mitigation. It is obvious the amount of effort that was required to perform the analyses at such a high level of accuracy. My comments follow:

1. **Carrier Pipe Radiation Monitor.** We have had poor results interlocking radiation monitors located in close proximity to a primary beam line. Beam halo can cause component damage and activation of the monitor. What nominal radiation levels are expected where the interlocked detector will be located?
2. **Voltage monitoring of V104-2.** With the current ground water activation analysis allowing only 82 lost beam pulses per year, I believe voltage monitoring should be required for V104-2. The cost for implementation is in the few K\$ range and is not prohibitively expensive. An even cheaper possibility would be to monitor the voltage output of the power supply. Then a deviation from any magnet in the string would be caught.
3. **Secondary containment of RAW Systems.** I would recommend interlocks that monitor for leakage from the raw systems. Secondary containment should be provided where reasonable. It wasn't totally clear from the presentation if any significant environmental release could occur. Will a raw water spill wash any contamination out of the target / horn chase into the under-drain that would be of a concern? Does the anticipated 20 gallon release include a catastrophic horn failure?
4. **NuMI Air Activation.** NuMI has a design goal to release less than 45 Ci/year. The review seemed to imply that NuMI is expecting to release close to their design goal. The entire laboratory has an IEPA Permit limit of 100 Ci/year. It is unlikely that the laboratory limit can be changed by more than 10 or 20 Ci/year.

The latest air activation estimates have MiniBooNE releasing approximately 15 Ci/year. Machine upgrades currently in progress will have P-Bar releasing 60 Ci in 2400 hours of stacking operations. Operating multiple emission sources simultaneously may necessitate a choice in program operations by the director's office.

I would highly recommend any and all efforts be taken to reduce air emissions before running beam. Attempting to fix a problem after the area has become radioactive will be much more difficult.

5. **Shielding Review.** At the end of the presentation there was reference to a previous agreement to submit the shielding assessment in pieces. I would recommend the entire assessment be submitted at one time. The worry I have is not getting a total picture at one time. It becomes too easy for something to be overlooked when reviewing sections of an assessment.